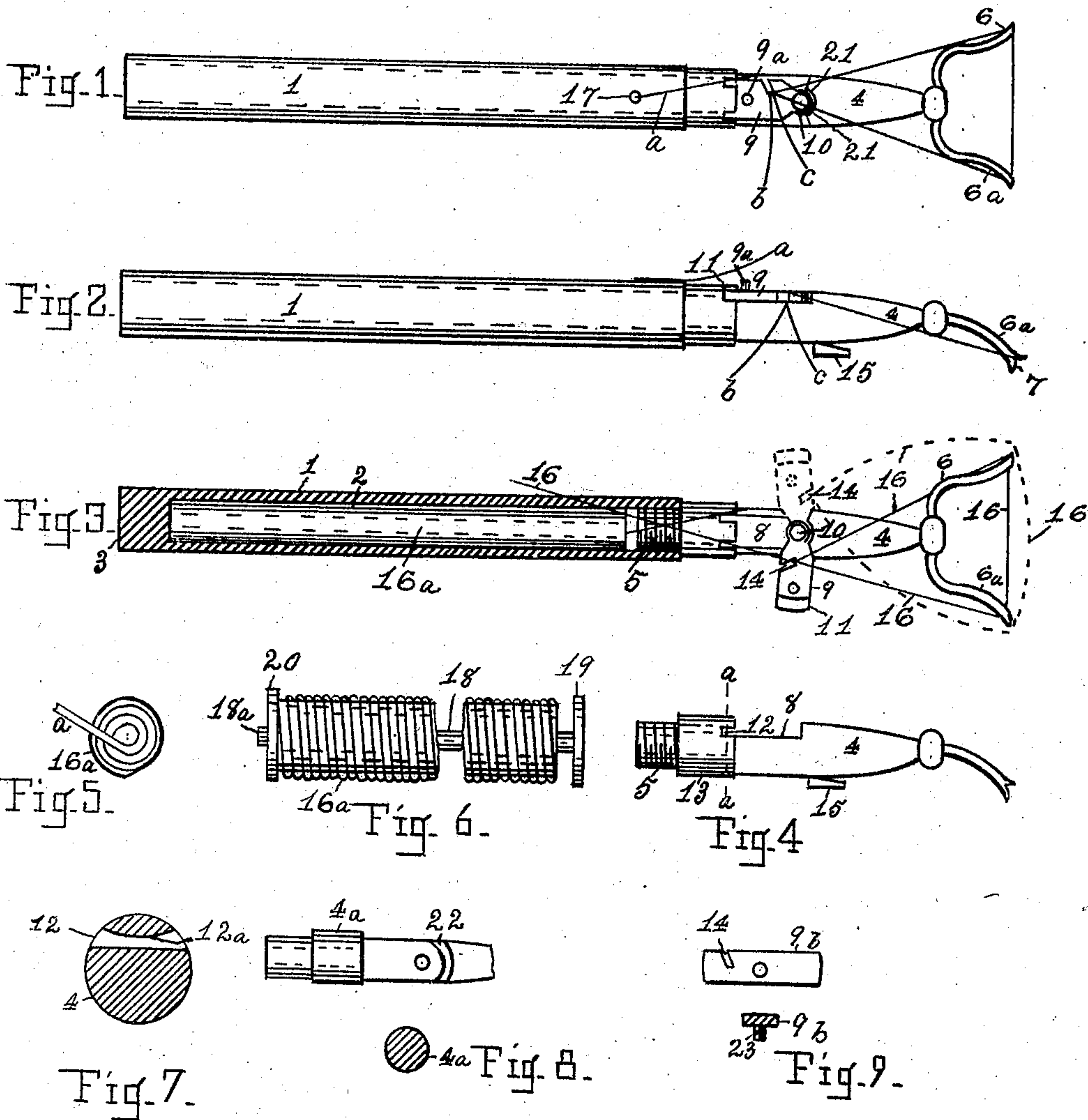


No. 806,300.

PATENTED DEC. 5, 1905.

J. SORENSON.  
DENTAL LIGATURE APPLIER.  
APPLICATION FILED MAR. 27, 1905.



WITNESSES:  
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JAMES SORENSON, OF NEENAH, WISCONSIN.

## DENTAL-LIGATURE APPLIER.

No. 806,300.

Specification of Letters Patent.

Patented Dec. 5 1905.

Application filed March 27, 1905. Serial No. 252,404.

*To all whom it may concern:*

Be it known that I, JAMES SORENSON, a citizen of the United States, residing at the city of Neenah, in the county of Winnebago and State of Wisconsin, have invented a new and useful Improvement in Dental-Ligature Appliers, of which the following is a specification.

My invention relates to a mechanical device for applying a ligature between two teeth in a person's mouth for pressing a rubber dam over and around a tooth by means of a thread carried by said device, the device having two metallic fingers spaced apart for its application to a tooth, one finger each side of said tooth, with the thread stretched tightly between said two fingers, the device comprising a tubular handle carrying a coil of suitable thread, mechanism for the application of the thread to the aforesaid fingers for stretching the thread tightly between said fingers and for locking the thread fast when so stretched, for cutting the thread and separating a sufficiency of it from the aforesaid coil for use upon that particular tooth, and, finally, for releasing simultaneously both ends of that particular piece of thread from the device and said fingers after its purpose has been accomplished, said mechanism being shown in the accompanying drawings, in which—

Figure 1 is a plan of the device having the thread applied to it and stretched between its fingers ready for its application between two teeth and also showing the loose ends of the thread after it has been cut from that of the coil. Fig. 2 is a side elevation of the device, as in Fig. 1. Fig. 3 is a plan showing the tubular handle in section and in elevation, the coil of thread therein, the two fingers of the device with the thread applied to them, a pivoted button in heavy lines in the position it occupies in applying the thread to the fingers, and in dotted lines both button and thread in the position they assume when the thread is released from the fingers. Fig. 4 is a side elevation of the stem of the device separated from the handle. Fig. 5 is an end view of a coil of thread as it is made for use in the tubular handle of the device. Fig. 6 is a longitudinal elevation of a short section of the aforesaid coil upon a spool upon which the coil is formed, the spool being separable and partly withdrawn from the coil. Fig. 7 is a transverse section of the stem 4 upon the line *a a* of Fig. 4. Figs.

8 and 9 are modifications in the stem and button. Figs. 5, 6, and 7 are upon a larger scale than the others.

Similar numerals and letters indicate like parts in the several views.

1 indicates the tubular handle of the device, which may be formed of metal, hard rubber, or other suitable material, a tube 2 extending nearly its entire length, the outer end 3 being closed and the other end provided with an internal screw-thread, with which a corresponding thread 5 engages. The stem 4 consists of a round tapering metallic piece having two longitudinally-curved fingers 6 and 6<sup>a</sup> upon their outer ends, said fingers being each provided with a notch 7 at their extremities. Intermediate the threaded end of the stem and the fingers the stem has a flattened portion 8, upon which the button 9 is arranged to swing upon the pivot-screw 10, said button being provided with a thinner part of a uniform thickness at its free end for entering a groove 12 (see Fig. 4) in the enlargement 13 of the stem and intermediate its ends having a slot 14 and operating-pin 9<sup>a</sup> for purposes to be described hereinafter.

The screw 10 is to be nicely fitted in the button and into the stem 4, so as to permit the button to swing freely, while it holds the button from any unnecessary vertical movement upon the screw. The groove 12, which is best shown in Fig. 7, has a part of the stem which overlaps the groove formed upon a curve 12<sup>a</sup>, so that the part 11 of the button in turning the button into a position parallel with the stem, as in Figs. 1 and 2, can be pushed under said curved part, and thereby press the thread tightly between the button and stem at the point where the thread is wound around the button. The swinging of the button stretches the thread around the fingers, and the pushing of the button by means of pressure upon the pin 9<sup>a</sup> holds the thread when so stretched.

Upon the side of the stem opposite the button a knife 15 is secured, which may be done by screwing its shank into the stem or by brazing the knife to the stem, its cutting edge being adjacent the stem and so shaped that a thread can be entered between the knife and stem and upon pulling the thread tightly toward the handle 1 the thread will be cut.

The thread 16, which is preferably a waxed silk one, is wound upon the spool, consisting of the shaft 18, having threaded end 18<sup>a</sup>, col-



lar 19, and removable collar 20. After the thread is wound it is removed from the spool, and only the thread in the coil 16<sup>a</sup> is placed in the tube 2 of the handle, a thread *a* of said coil being passed through the perforation 17 of the handle.

In applying the thread to the fingers 6 and 6<sup>a</sup> a sufficient length of thread is pulled through the perforation 17 for use at that particular time, its free end being passed around the stem and between said stem and the knife 15. The button is then turned into a position shown by heavy lines in Fig. 3, which is at a nearly right angle with the stem 4.

It may be noted here that the stem is provided with stops 21, one each side of the button, for preventing the turning of the button beyond a determined point. The thread after leaving the knife is brought over the button, passed into and through the slot 14, thence carried up and around the end of the finger 6, through the notch therein. Thence it is carried around the end of the finger 6<sup>a</sup>, then to and over the button, through the slot therein, over and around the button and to near the perforation 17 of the handle, where it and the thread coming out of the perforation are held between the thumb of the operator and the handle.

It will be observed that in leading the thread through the slot 14 and winding it around the button the thread is in a position to be engaged by the button as said button is turned into a position parallel with the stem, the thread being thereby pinched between the button and stem and securely held. The operator now turns the button by means of the pin 9<sup>a</sup> into the position shown in Figs. 1 and 2, by which movement the thread is drawn tightly around and between the fingers 6 and 6<sup>a</sup>, cutting it off by said movement and leaving the loose ends *b* and *c*, the end *a* being the end first drawn through the perforation 17. The device is now ready for use in pressing a rubber dam over a tooth and between two teeth by placing the part of the thread that is between the ends of the fingers upon the rubber and pressing downward around or between the teeth. After it has served its purpose upon swinging the button into the position shown by dotted lines in Fig. 3 the ends of the thread which have been held between the button and stem by reason of the end 11 of the button being engaged with the curved part 12<sup>a</sup> of the upper side of the slot 12 will be released and the device can be laid aside while other work upon the tooth goes on, the thread as it comes off of the fingers being shown by dotted lines around the fingers and stem. It is a common practice for dentists to use a thread for pressing a rubber dam around a tooth by holding the ends of the thread by the thumb and finger of each hand and pressing downward upon

the rubber; but in doing so both hands are required, while with this device but one hand is required, the other being free for other use.

It will be evident that thread can be waxed by hand in the same manner that sewing-thread is usually waxed by a seamstress and then applied to the fingers of this device for use in the same manner that the thread from the coil, as herein described, is to be used; but for convenience, speed, hygienic results, and artistic results this will be found far superior. It may be seen also that a button can be pivoted near the middle of its length to the stem and having a slot for receiving the thread between said pivot and the end of the button which is toward the handle and be used in place of the button shown in Figs. 1, 2, and 3, and thus dispense with the groove 12 and also with flattening a place upon the stem upon which to pivot the button, as is shown in the modifications Figs. 8 and 9.

Fig. 8 shows a plan and cross-section, respectively, of a part of the stem 4<sup>a</sup>, the cross-section being at a point just to the left of the button-pivot. Fig. 9 shows a plan and cross-section, respectively, of the button 9<sup>b</sup>. The stem may be left round and the button flat, the former being provided with a groove 22 and the latter with a pin 23, the groove being for allowing the pin in the button to permit the button to swing into a position transversely of the stem, while the pin holds the button from swinging beyond a determined point by reason of its engaging with the outside of the stem as the button is turned.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a dental-ligature applier, the combination of a tubular handle, a coil of thread therein, an aperture for the passage of a thread of said coil through said handle, a stem detachable from said handle and having two fingers, spaced apart, extending from one end of said stem, and a button arranged upon said stem for tightening the thread between said fingers by the turning of said button, substantially as described.

2. In a dental-ligature applier, the combination of a tubular handle, a coil of thread therein, an aperture for the passage of a thread of said coil through said handle, a stem detachable from said handle having two fingers, spaced apart, extending from one end of said stem, a button arranged upon said stem for tightening the thread between said fingers by the turning thereof, and a knife for cutting said thread as said button is turned, substantially as set forth.

3. In a dental-ligature applier, the combination of a tubular handle, a coil of thread therein, an aperture for the passage of a thread of said coil through said handle, a stem detachable from said handle having



two fingers, spaced apart, extending from one end of said stem, a button pivoted upon said stem, a slot in one edge of said button intermediate its pivot and end nearest the handle adapted for receiving a thread of said coil and having it wound around said button, the button being arranged for tightening the thread between said fingers by the turning thereof from a transverse to a parallel position with said stem, substantially as described.

4. In a dental-ligature applier, the combination of a tubular handle, a coil of thread therein, a perforation in said handle for the passage of a thread of said coil, a stem detachable from said handle having two fingers, spaced apart, and extending from the outer end of said stem, a flattened surface intermediate the ends of said stem, a groove at one end of said flattened surface having a convex

inner surface upon the outer side of said groove, a button pivotally secured upon said flattened surface having one end arranged for passing through said groove as the button is turned from a transverse position upon one side of the stem to a like position upon its other side, a slot in one edge of said button intermediate the end passing through said groove and its pivot adapted to receive a thread of said coil and have the same wound around said button when in a transverse position with said stem, and thereby to tighten the thread between said fingers as the button is turned into a position parallel with said stem, substantially as described.

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Witnesses:

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